



Selection of Business Funding Proposals of Micro, Small, and Medium Enterprises Using Analytic Network Process at PT Sarana Jatim Ventura

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Presentation Outline



Introduction

Research Background, Problem Formulation, Objectives, Benefits, Research Scope, Research Structure

Literature Review

Decision Problem, Multi Criteria Decision Analysis, Analytic Network Process, Buffa & Sarin Principle, MSMEs, VCC

Research Methodology

Research Flowchart and Research Stages

Data Collection and Processing

Profile of PT SJV, Data Collection, Data Processing

Analysis and Discussion

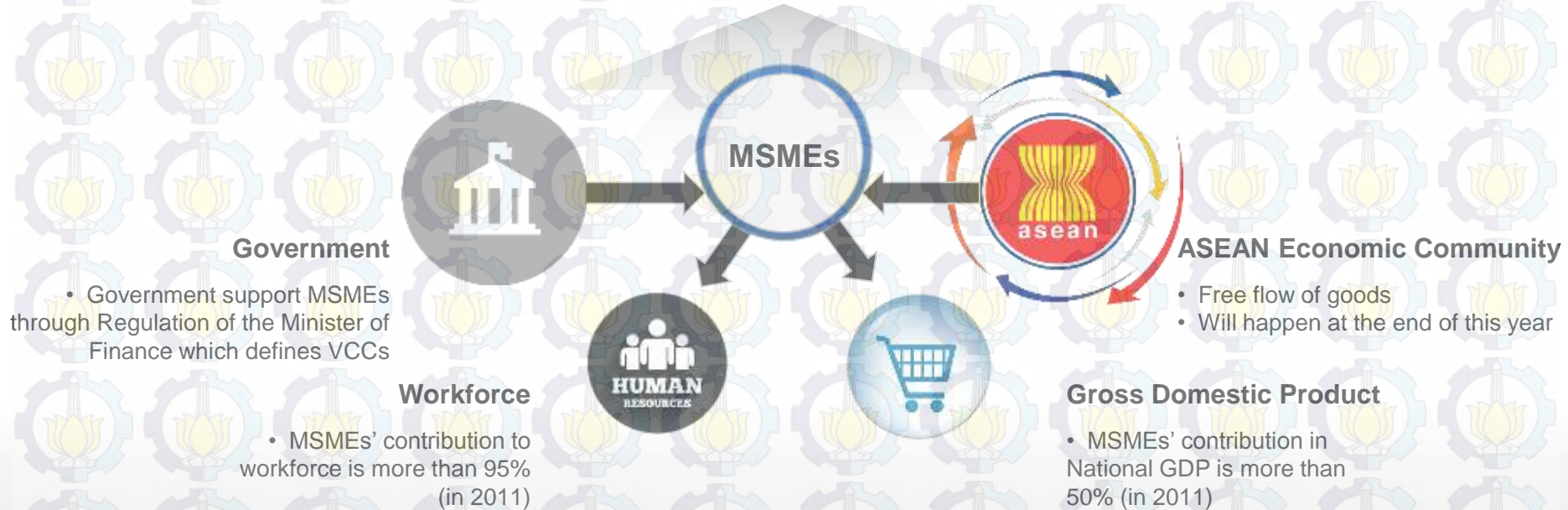
Result Analysis, Changes in Criteria's Weight, Difference of Original Rank and One-by-One Elimination Rank, Different Amount of Alternatives Effect to the Ranking, Budget Constraint

The background features a repeating pattern of light blue gears, each containing a yellow lotus flower. A wooden gavel is positioned vertically on the left side of the image, with its head resting on a light-colored wooden block. The word "Introduction" is written in a bold, brown, sans-serif font across the center of the wooden block.

Introduction

Research Background

Importance of MSMEs



Research Background

PT Sarana Jatim Ventura

Existing Condition

1. Selection Process

- Only by discussion among investee committee.

2. Waiting Period

- Very short, usually several days to one week

Desired Condition

1. Selection Process

- Systematic way that considering benefits and risks.

2. Waiting Period

- Longer than usual, may one month or more.

To prevent losses
that might
happened

To cope with new
equity investment
program

DIFFERENCES

Problem Formulation



Problem discussed in this research is how to select several best business funding proposals at PT SJV considering various aspects using ANP and Buffa & Sarin Principle.

Research Objectives



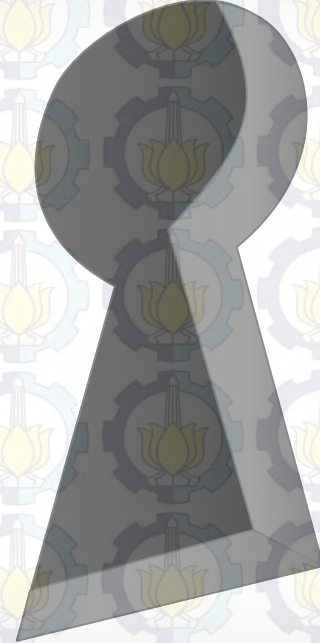
Identify factors that affect selection process of proposals



Construct decision model ANP

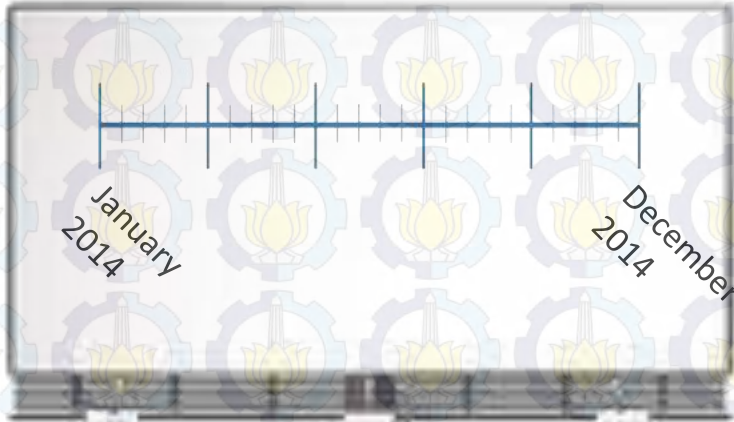


Give recommendations for proposal selection process



Research Scope

Limitations



Research Scope

Assumptions

Amount of fund
requested is as
needed by
MSMEs

PT SJV knows all
data regarding
MSMEs

The background features a repeating pattern of light blue gears, each containing a yellow lotus flower. A wooden gavel is positioned vertically on the left side of the image, partially overlapping the pattern. The text "Literature Review" is centered in the middle of the image.

Literature Review

List of Literature Review



Types of Decision Problem

Multi Criteria Decision Analysis

Analytic Network Process

Buffa & Sarin Principle

Micro, Small, and Medium Enterprises

Venture Capital Company

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Research Methodology

Problem Identification



Data Collection



Data Processing

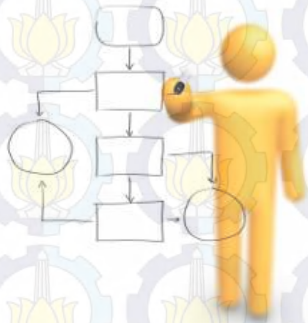


Analysis & Discussion

Literature Review

Real Condition
Examination

→ Interview
→ Discussion





Problem Identification

Data Collection

Data Processing

Analysis & Discussion

Primary data

- Selection criteria
- Comparison matrices
- Rating of Certain Criteria
- Criteria's relationship

Secondary data

- List of MSMEs in 2014
- MSMEs' financial
- MSMEs' management
- MSMEs' risk
- MSMEs' legal


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graph TD; A[Problem Identification] --> B[Data Collection]; B --> C[Data Processing]; C --> D[Analysis & Discussion];
```

Problem Identification

Data Collection

Initial Selection
(Buffa & Sarin Principle)

- Legal status
- Legal document

Data Processing

Ranking Proposals

- Criteria relationship diagram
- ANP network model
- Eigenvector calculation
- Super decision
- Original rank and one-by-one elimination rank

Analysis & Discussion

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graph TD; A[Problem Identification] --> B[Data Collection]; B --> C[Data Processing]; C --> D[Analysis & Discussion];
```

Problem Identification

Data Collection

Data Processing


Analysis & Discussion

→ Changes in Criteria's Weight

→ Result Analysis

→ Different Amount of Alternatives Effect to the Ranking

→ Budget Constraint

The background features a repeating pattern of light blue gears, each containing a yellow lotus flower. A wooden gavel is positioned vertically on the left side of the image, with its head resting on a light-colored wooden surface. The text "Data Collection & Processing" is centered on the right side of the image, overlaid on the wooden surface.

Data Collection & Processing

Data Collection

List of Criteria

Code	Cluster	Code	Criteria
A	Financial	A1	Funding amount
		A2	Rate of Profit Sharing
		A3	Equity
		A4	Profit
B	Management	B1	Workforce
		B2	Cooperation
C	Risk	C1	Debt Service Ratio (DSR)
		C2	Coverage
D	Market	D1	Market Type
E	Legal	E1	Legal Document

Data Collection

Criteria Definition

Criteria	Definition
A1	Total amount of funding needed by MSMEs
A2	Willingness of MSMEs to share its profit with PT SJV (in percentage)
A3	MSMEs' total amount of equities
A4	Profit of each MSMEs
B1	Total workforce of MSMEs
B2	Previous cooperation with PT SJV
C1	Ability to pay debt
C2	Ratio of collateral's monetary value with amount of loan
D1	Market type of MSMEs, it might the captive one or not
E1	Legal document owned by MSMEs in term of its business

Data Collection

Questioner of Clusters Comparison

Cluster	A	B	C	D	E	F
A	1	3	1	1	3	3
B		1	1/3	1/3	1/3	1
C			1	1	3	3
D				1	1	1
E					1	3
F						1

Data Collection

Questioner of Criteria Comparison

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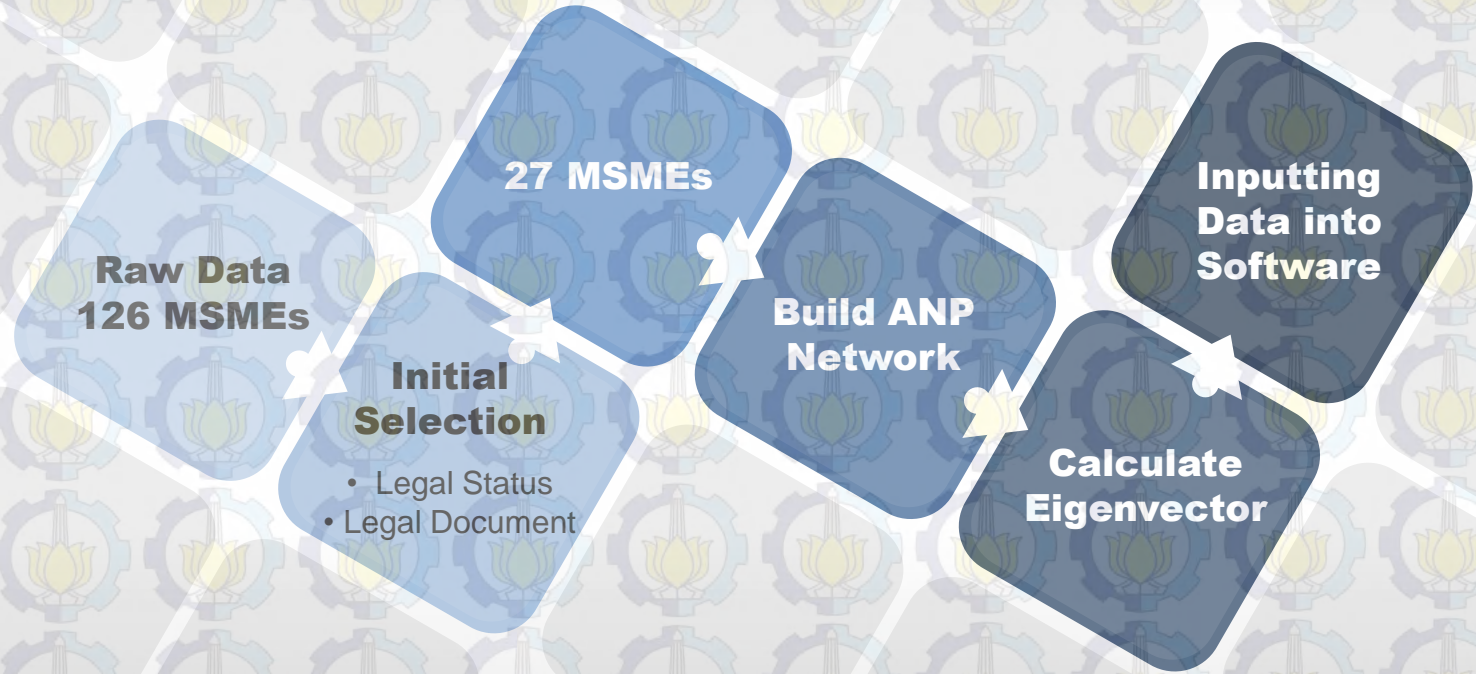
Data Collection

Certain Criteria Rating

Code	MSMEs	Criteria		
		Relation	DSR	Market Type
01	LARON, UD	8	7	9
02	JAYA MAKMUR, CV	1	7	7
03	SETIA KAWAN, CV	1	6	7
04	GALENA PERKASA, PT	8	8	8
05	SURYA GRAHA KENCANA, PT	1	7	6
06	BONLI CIPTA SEJAHTERA, PT	8	8	9
07	SARI LOGAM, UD	1	6	7
08	SURYA BINTANG SINERGY, PT	5	8	8
09	MULYA JAYA, UD	1	6	7
10	LENTERA HATI, UD	1	6	8
11	ENOS BINTANG SELAMAT, PT	1	8	9
12	LANGGENG SENTOSA, UD	1	8	8
13	UTOMO, UD	9	8	9

14	TIMBUL REJEKI, CV	8	6	8
15	PUTRA WIDATAMA, CV	9	9	9
16	MUTIARA SEJATI, UD	9	8	9
17	CATUR JAYA NUGRAHA, CV	5	7	7
18	LARIS, UD	8	7	7
19	BINTANG ALAM SENTOSA, PT	8	8	8
20	ARJUNA CREATIVE, CV	5	7	6
21	MANNA, UD	8	8	8
22	JAMUR, UD	7	6	7
23	CITRA PERSADA, UD	9	8	8
24	KHARISMA ASTRA NUSANTARA, PT	8	8	9
25	MAJU BERSAMA SEJAHTERA, CV	7	7	8
26	BINTANG ARSITA SAMUDERA, PT	9	9	9
27	LAGAWICO PRATAMA, PT	8	8	8

Data Processing



Data Processing

Initial Selection – Buffa & Sarin Principle

Raw Data

There are 126 MSMEs in 2014 that will be processed in this section.

Legal Status

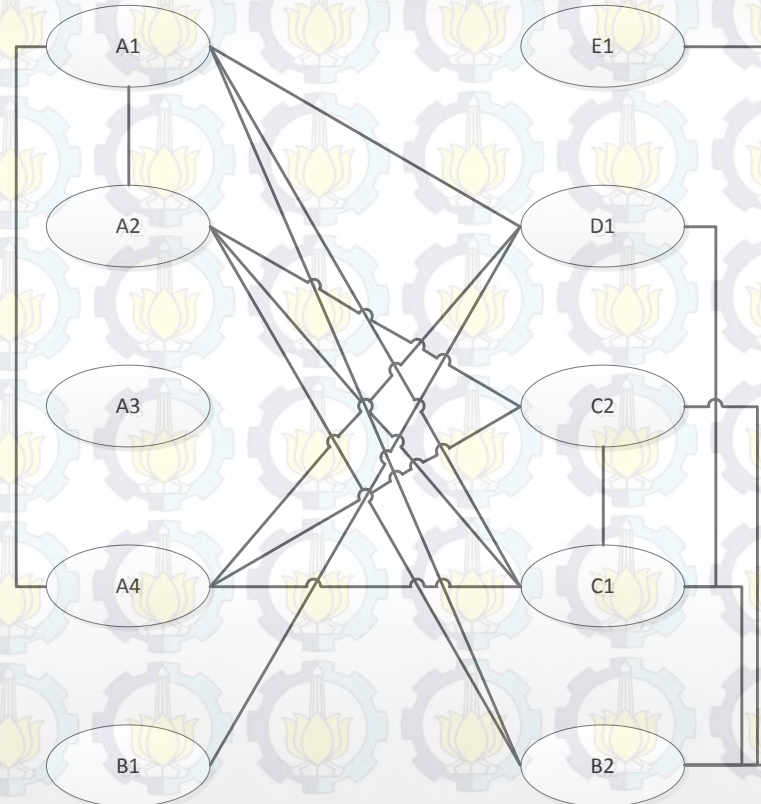
**Checking MSMEs legal status, if it doesn't have one, it will be excluded.
126 MSMEs → 30 MSMEs**

Legal Document

**Checking MSMEs legal document, if it doesn't have, it will be excluded.
30 MSMEs → 27 MSMEs**

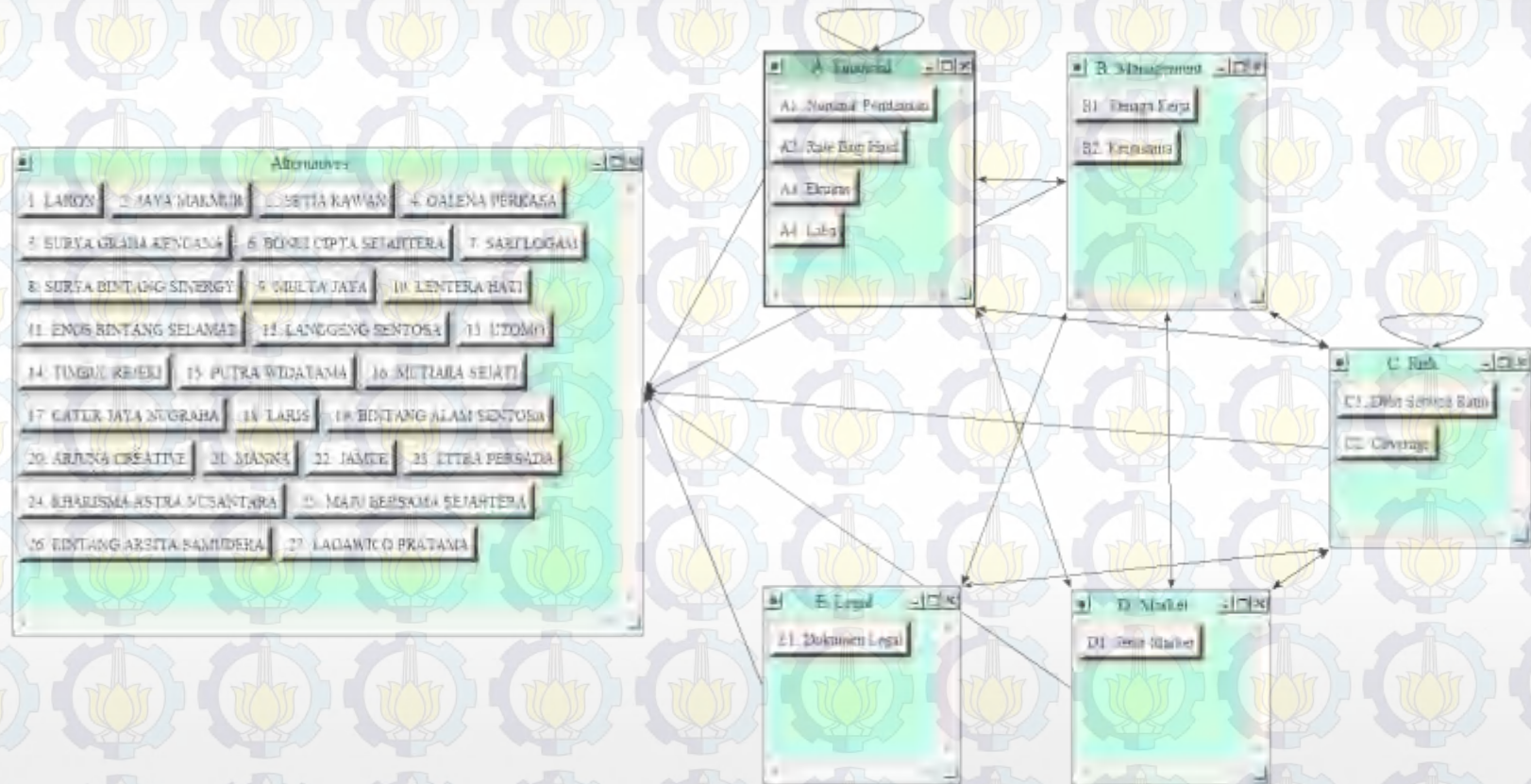
Data Processing

ANP Selection – Criteria Relationship Diagram



Data Processing

ANP Selection – Network Model



Data Processing

ANP Selection – Calculation of Eigenvector

Code	MSMEs	Financial			
		Funding Amount	Rate of Profit Sharing	Equity	Profit
01	LARON, UD	0.00543	0.00699	0.00875	0.00296
02	JAYA MAKMUR, CV	0.04527	0.00011	0.15369	0.09999
03	SETIA KAWAN, CV	0.00769	0.00443	0.00917	0.04080
04	GALENA PERKASA, PT	0.03395	0.01770	0.14974	0.29556
05	SURYA GRAHA KENCANA, PT	0.09054	0.03275	0.05792	0.03014
06	BONLI CIPTA SEJAHTERA, PT	0.01132	0.12685	0.04417	0.14011
07	SARI LOGAM, UD	0.20371	0.04178	0.00893	0.01615
08	SURYA BINTANG SINERGY, PT	0.01132	0.16818	0.01707	0.02163
09	MULYA JAYA, UD	0.01358	0.03753	0.00486	0.01700
10	LENTERA HATI, UD	0.01132	0.02009	0.01481	0.01991
11	ENOS BINTANG SELAMAT, PT	0.11317	0.01106	0.03360	0.00600
12	LANGGENG SENTOSA, UD	0.00905	0.01956	0.00201	0.00059
13	UTOMO, UD	0.01132	0.02036	0.01748	0.03634
14	TIMBUL REJEKI, CV	0.01132	0.00397	0.02794	0.02261

ANP Selection – Inputting Cluster Comparison

Combined
Compliance

Data Processing

ANP Selection – Inputting Criteria Comparison

Comparisons for Subnet under 1.Benefits: formulaic

1. Choose 2. Node comparisons with respect to C2. Coverage 3. Results

Node Cluster: Graphical Verbal Matrix Questionnaire Direct

Choose Node

Comparisons wrt "C2. Coverage" node in "A. Financial" cluster
A2. Rate Bagi Hasil is equally as important as A4. Laba

C2. Coverage

Cluster: C. Risk

Choose Cluster

A. Financial

1. A2. Rate Bagi Hasil is equally as important as A4. Laba

Normal Hybrid

Inconsistency: 0.00000

A2. Rate ~	0.50000
A4. Laba	0.50000

Completed Comparison

Copy to clipboard

Restore

Data Processing

ANP Selection – Inputting Alternative Comparison

1. Choose 2. Node comparisons with respect to A1. Nominal Pendanaan 3. Results

Choose Node

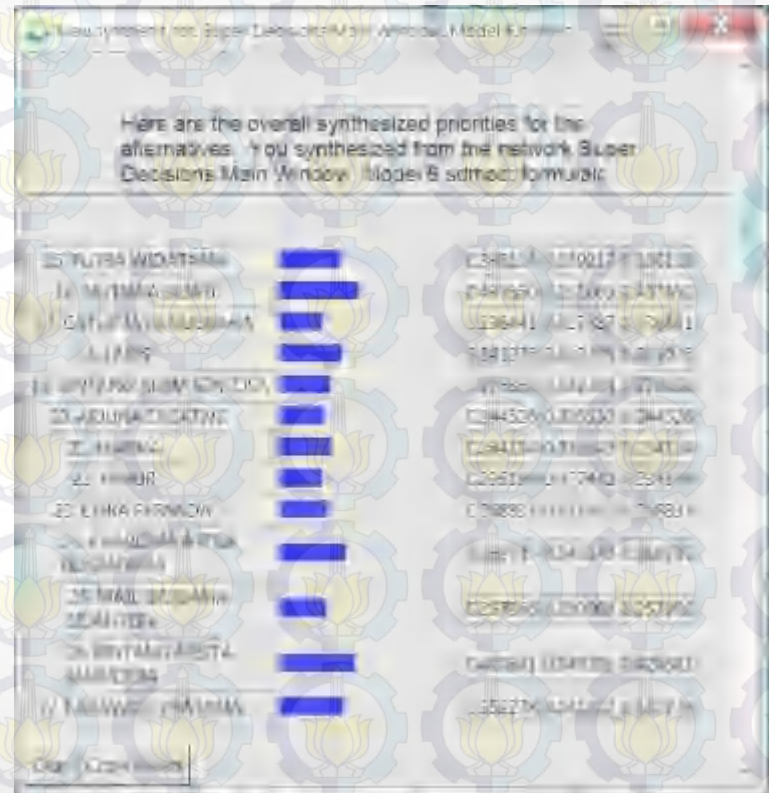
Cluster: Financial

Choose Cluster

Node	Cluster	Value
1. LARDA	Financial	0.08724
2. JAYA-M	Financial	0.01046
3. SETIA	Financial	0.08160
4. CALENA	Financial	0.01305
5. SURYA	Financial	0.00823
6. BUNLI	Financial	0.04159
7. SARIL	Financial	0.00233
8. SURYA	Financial	0.04159
9. MULIA	Financial	0.03458
10. LENTE	Financial	0.04159
11. ENOSIR	Financial	0.00419
12. LANGSI	Financial	0.05235
13. UTOANG	Financial	0.04159
14. TIMBU	Financial	0.04159
15. PUTRA	Financial	0.02093
16. MUTIA	Financial	0.03458
17. CATUR	Financial	0.05235
18. LAFIS	Financial	0.02203
19. BINTA	Financial	0.04159
20. ARJUN	Financial	0.05982
21. MANNA	Financial	0.06977
22. JAMUS	Financial	0.10458
23. CITRA	Financial	0.02093

Data Processing

ANP Selection – Synthesize the Whole Model



Data Processing

ANP Selection – Original Rank


Rank	MSMEs	Ideals	Normals	Raw
1	06. BONLI CIPTA SEJAHTERA	1	0.116675	1
2	04. GALENA PERKASA	0.660011	0.077007	0.660011
3	16. MUTIARA SEJATI	0.43765	0.051063	0.43765
4	26. BINTANG ARSITA SAMUDERA	0.420881	0.049106	0.420881
5	14. TIMBUL REJEKI	0.399455	0.046607	0.399455
6	02. JAYA MAKMUR	0.375405	0.0438	0.375405
7	24. KHARISMA ASTRA NUSANTARA	0.369745	0.04314	0.369745
8	27. LAGAWICO PRATAMA	0.352278	0.041102	0.352278
9	18. LARIS	0.341076	0.039795	0.341076
10	15. PUTRA WIDATAMA	0.336118	0.039217	0.336118
11	13. UTOMO	0.293857	0.034286	0.293857
12	21. MANNA	0.284114	0.033149	0.284114
13	01. LARON	0.279527	0.032614	0.279527

14	08. SURYA BINTANG SINERGY	0.279052	0.032558	0.279052
15	19. BINTANG ALAM SENTOSA	0.276868	0.032304	0.276868
16	23. CITRA PERSADA	0.268837	0.031367	0.268837
17	25. MAJU BERSAMA SEJAHTERA	0.257966	0.030098	0.257966
18	20. ARJUNA CREATIVE	0.244526	0.02853	0.244526
19	17. CATUR JAYA NUGRAHA	0.236441	0.027587	0.236441
20	22. JAMUR	0.235199	0.027442	0.235199
21	03. SETIA KAWAN	0.212851	0.024834	0.212851
22	05. SURYA GRAHA KENCANA	0.198848	0.023201	0.198848
23	11. ENOS BINTANG SELAMAT	0.19241	0.022449	0.19241
24	09. MULYA JAYA	0.168046	0.019607	0.168046
25	10. LENTERA HATI	0.166262	0.019399	0.166262
26	12. LANGGENG SENTOSA	0.159208	0.018576	0.159208
27	07. SARI LOGAM	0.124169	0.014487	0.124169

Data Processing

ANP Selection – One-by-One Elimination Rank

Ranking	Unique Code	
	One-by-One Elimination Rank	Original Rank
1	06	06
2	04	04
3	16	16
4	26	26
5	14	14
6	02	02
7	18	24
8	24	27
9	27	18
10	13	15
11	15	13
12	08	21
13	11	01
14	21	08
15	03	19
16	23	23
17	01	25
18	19	20
19	22	17
20	25	22
21	17	03
22	20	05
23	05	11
24	10	09
25	09	10
26	07	12
27	12	07

The background features a repeating pattern of light blue gears, each containing a yellow lotus flower. A wooden gavel is positioned vertically on the left side of the image, with its head resting on a light-colored wooden block. The text "Analysis & Discussion" is centered on the wooden block.

Analysis & Discussion

Analysis and Discussion

Changes in Criteria's Weight

Criteria	Total Changes	Order
A1	320	2
A2	321	1
A3	177	8
A4	199	6
B1	216	4
B2	182	7
C1	137	10
C2	269	3
D1	165	9
E1	201	5

Analysis and Discussion

Different Amount of Alternatives Effect to the Ranking

Ranking	MSMEs' Unique Code			
	Original	5 Highest Rank Removal	5 Middle rank Removal	5 Lowest Rank Removal
1	6		6	6
2	4		4	4
3	16		16	16
4	26		26	26
5	14		14	14
6	2	2	24	2
7	24	18	15	24
8	27	24	27	27
9	18	27	2	15
10	15	15	18	18
11	13	13	13	13

Ranking	MSMEs' Unique Code			
	Original	5 Highest Rank Removal	5 Middle rank Removal	5 Lowest Rank Removal
12	21	21		21
13	1	8		8
14	8	1		1
15	19	23		19
16	23	19		23
17	25	25	25	25
18	20	3	20	20
19	17	20	22	17
20	22	22	17	22
21	3	11	3	3
22	5	17	5	5
23	11	5	11	
24	9	9	9	
25	10	10	10	
26	12	12	12	
27	7	7	7	

Analysis and Discussion

Budget Constraint

When choosing several possible alternatives, the best rank might not be the best possible outcomes.

Budget Limit = Rp 10.000.000.000,00 (ten billion rupiah)

If remaining budget not enough for the next rank, middle or lower rank might be chosen to spend all of the budget.

Introducing new parameter, Expected Return. Calculated by multiplying A2 and A4 criteria.

There will be four scenarios to do budget limit experiment.

1. Fund the highest original rank MSMEs' proposals
2. Fund the highest 1-by-1 elimination rank MSMEs' proposals
3. Fund the lowest amount of funding needed
4. Fund the highest possible expected return

Analysis and Discussion

Budget Constraint – Scenario 1

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
2	2	04	1,500,000,000	2.000%	16,920,816,154	338,416,323
3	3	16	600,000,000	0.380%	879,338,000	3,341,484
4	4	26	1,500,000,000	1.310%	3,194,019,000	41,841,649
5	5	14	500,000,000	0.449%	1,294,636,000	5,812,916
6	6	02	2,000,000,000	0.012%	5,724,326,620	686,919
7	9	18	950,000,000	7.140%	1,078,248,000	76,986,907
8	10	15	1,000,000,000	20.520%	334,224,610	68,582,890
9	11	13	500,000,000	2.300%	2,080,200,000	47,844,600
10	12	21	300,000,000	0.820%	1,142,639,000	9,369,640
11	13	01	240,000,000	0.790%	169,400,000	1,338,260
12	17	25	300,000,000	1.580%	340,478,402	5,379,559
Total Expected Return						1,749,031,082
The Remaining Budget						110,000,000

Analysis and Discussion

Budget Constraint – Scenario 2

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
2	2	04	1,500,000,000	2.000%	16,920,816,154	338,416,323
3	3	16	600,000,000	0.380%	879,338,000	3,341,484
4	4	26	1,500,000,000	1.310%	3,194,019,000	41,841,649
5	5	14	500,000,000	0.449%	1,294,636,000	5,812,916
6	6	02	2,000,000,000	0.012%	5,724,326,620	686,919
7	7	18	950,000,000	7.140%	1,078,248,000	76,986,907
8	10	13	500,000,000	2.300%	2,080,200,000	47,844,600
9	11	15	1,000,000,000	20.520%	334,224,610	68,582,890
10	12	08	500,000,000	19.000%	1,238,048,000	235,229,120
11	14	21	300,000,000	0.820%	1,142,639,000	9,369,640
Total Expected Return						1,977,542,383
The Remaining Budget						150,000,000

Budget Constraint – Scenario 3

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	20	22	200,000,000	0.860%	411,303,593	3,537,211
2	13	01	240,000,000	0.790%	169,400,000	1,338,260
3	12	21	300,000,000	0.820%	1,142,639,000	9,369,640
4	17	25	300,000,000	1.580%	340,478,402	5,379,559
5	22	03	339,653,842	0.500%	2,335,568,168	11,677,841
6	18	20	350,000,000	1.560%	407,528,000	6,357,437
7	26	12	400,000,000	2.210%	33,940,276	750,080
8	19	17	400,000,000	3.490%	251,470,000	8,776,303
9	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
10	14	08	500,000,000	19.000%	1,238,048,000	235,229,120
11	25	10	500,000,000	2.270%	1,139,743,000	25,872,166
12	11	13	500,000,000	2.300%	2,080,200,000	47,844,600
13	5	14	500,000,000	0.449%	1,294,636,000	5,812,916
14	15	19	500,000,000	12.000%	573,762,000	68,851,440
15	24	09	600,000,000	4.240%	973,415,000	41,272,796
16	3	16	600,000,000	0.380%	879,338,000	3,341,484
17	9	18	950,000,000	7.140%	1,078,248,000	76,986,907
18	10	15	1,000,000,000	20.520%	334,224,610	68,582,890
19	16	23	1,000,000,000	0.850%	1,648,851,000	14,015,234
					Total Expected Return	1,784,425,818
					The Remaining Budget	320,346,158

Analysis and Discussion

Budget Constraint – Scenario 4

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
2	2	04	1,500,000,000	2.000%	16,920,816,154	338,416,323
3	14	08	500,000,000	19.000%	1,238,048,000	235,229,120
4	8	27	7,000,000,000	3.350%	3,213,035,000	107,636,673
5	11	13	500,000,000	2.300%	2,080,200,000	47,844,600
Total Expected Return						1,878,556,651
The Remaining Budget						-

Analysis and Discussion

Budget Constraint – Result Overview

Scenario	Expected Return	Remaining Budget
1	1,749,031,082	110,000,000
2	1,977,542,383	150,000,000
3	1,784,425,818	320,346,158
4	1,878,556,651	0

The background features a repeating pattern of light blue gears, each containing a yellow lotus flower. A wooden gavel is positioned vertically on the left side of the image, partially overlapping the pattern. The word "Conclusions" is written in a bold, brown, sans-serif font in the center of the image.

Conclusions

Conclusion

Conclusions

- There are several criteria in business funding proposal selection process. Some of them is the critical one; legal status and MSMEs' business legal document. Others are not critical but important; (1) amount of funding, (2) rate of profit sharing, (3) MSMEs' equity, (4) MSMEs' profit, (5) total workforce, (6) previous relation with PT SJV, (7) debt service ratio, (8) collateral coverage, (9) market type, and (10) completeness of legal document.
- Not all of criteria have relation to each other; MSMEs' equity is the only criterion, which does not have relationship to other criteria.
- Funding amount and rate of profit sharing are criteria that affect overall ranking the most. In opposite, debt service ratio have the least impact to the ranking.
- Exclusion of several proposals from ANP calculation does affect the ranking. However, the effect is very small, only a slight change in rank composition.
- From the budget constraint scenario, it is known that the best scenario is one-by-one elimination rank. In addition, the original rank of ANP is the worst in term of expected return value.
- In this research, rate of profit sharing and MSMEs' profit criteria able to represent the expected return value.

Conclusion

Recommendations

For PT SJV

1. **Consider each criterion relation, it might affect the overall rank**
2. **Consider the use of ANP as one of methods to choose the best MSMEs' proposals.**

For Future Researches in the Similar Field

It is advisable from this research to consider budget allocation when choosing proposals. This research is lack of that. Moreover, the social, environmental, and psychological aspects should be quantified and included in decision-making calculation.

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THANK YOU